Financial Plan & Investment Strategies Workshop Summary DRAFT

California Department of Transportation

Transportation Asset Management Plan Project

Event Date: June 14, 2017

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1. Overview

This document details the results of the California Department of Transportation (Caltrans) Transportation Asset Management (TAM) Financial Plan & Investment Strategies Workshop held on June 14, 2017, at Caltrans District 4 in Oakland, CA. The workshop was held as part of the effort to develop a Transportation Asset Management Plan (TAMP) for California. TAMP project stakeholders met to review available transportation funding and asset performance projections, recommend funding assumptions for National Highway System (NHS) assets, and influence the development of the financial plan and investment strategies components of the California TAMP. This interactive workshop resulted in an improved understanding of financial planning and investment strategies for the California TAMP. Workshop attendees developed and prioritized a series of questions and recommendations on the investment prioritization process.

2. Workshop Presentations and Discussions

Mike Johnson, Caltrans' Statewide Asset Management Engineer and TAMP Project Manager, kicked off the workshop by welcoming the participants and providing a discussion of the project and overview of the TAMP. Following Mike, Paul Schneider, Federal Highway Administration (FHWA), described the work done so far and the necessity of cooperation and coordination between FHWA, state governments, and local governments.

Bill Robert presented an overview of asset inventory and conditions in California for pavement, bridge, ITS, and culverts. Following the overview, Gina Coates from Caltrans described the transportation funding picture for Caltrans and reviewed different revenue income and distribution proposals through Senate Bill 1 (SB1). Following Mike's review of the State Highway Operations and Protection Program (SHOPP), Bill presented local pavement and bridge spending levels (pre-SB1).

Sui Tan, of the Metropolitan Transportation Commission (MTC), presented the MTC's scope and pavement management system (PMS), and discussed challenges related to funding needs. Bill ended the workshop presentations by reviewing long-term targets and projections of bridges and pavements.

Following the workshop's introductory session, participants split into small groups to discuss investment prioritization for TAMP development and to give feedback on the plans and projections discussed in the presentations.

The final session of the workshop was an open discussion and presentation of the results of the smaller group sessions. Members were asked to give feedback on the current progress and methods of TAMP development and provide any other ideas that were discussed in the smaller groups.

The workshop ended with a summary of the discussions and an overview of the next steps and meetings to continue TAMP planning and development. The workshop presentation is available in Appendix B.

2.1 Summary of Workshop Discussions

The following is a summary of major discussion points from the workshop, organized by agenda item. Following each of the major agenda items, the group discussed various issues raised during the presentation and exercises.

Introduction

Mike Johnson welcomed everyone to the third workshop supporting the California TAMP development process and reviewed the state's progress so far. He mentioned the past two workshops--one focusing on Visions and Objectives and the other on Risk Management. There will be one final workshop focusing on target setting for TAMP Building, scheduled for July. The TAMP should be submitted to the California Transportation Commission (Commission) by March of 2018 to meet FHWA's April 2018 guideline.

Financial Planning and Investment Strategies Overview

Mike explained the overall goal of the workshop was to help understand the financial landscape and discuss projections in preparation for target setting and meeting the FHWA requirements for TAMP. The objectives of the workshop included:

- Reviewing funding assumptions for California's NHS roads and bridges
- Reviewing projections of future asset conditions
- Determining how to project conditions and funding levels for agency-owned assets
- Determining asset investment priorities

Mike informed the attendees the Commission will adopt the Moving Ahead for Progress in the 21st Century Act (MAP-21) requirement at its June 29th meeting. He also reviewed the TAMP requirements and the extent of NHS roads and bridges in California. Roughly 10% of the nation's NHS (measured in road miles) are in California, under both state and local jurisdiction.

Mike reviewed components required for a TAMP and explained how risk has to be considered in developing both the Financial Plan and the Investment Strategies. He acknowledged there may be many challenges and complexities in the development process. Mike explained there are many inconsistencies in estimating funding sources on the local level because of the complex system of generating revenue on the local level (sometimes through special taxes). Other complexities may arise from new mandates resulting from the passage of the SB1, including whether or not state and private vendors can accommodate additional construction work or even have the equipment necessary to work towards the requirements. There may be challenges on how information is tracked and agencies' limited ability to separate NHS from other parts of the owner's system.

Mike then touched on key challenges in defining goals and objectives for the TAMP, including connecting the work to the broader Caltrans goals (e.g., stewardship, safety, environment, economy, healthy communities, etc.) and aligning Caltrans' goals with the varied goals of the local agencies.

At the end of his presentation, Mike invited Paul Schneider from the FHWA to give a few remarks. The long-term effort to introduce asset management and performance management began in 2012 when MAP-21 was introduced. Paul highlighted the team's five-year effort to develop consensus on the rulemaking, highlighting the extensive work that Chris Long and Steve Healow have done. Paul reassured attendees that FHWA and Congress understand the complexities that arise with trying to implement regulations, and that FHWA will offer support to agencies on lifecycle planning, performance management, target setting, and gap analysis. FHWA is supporting states in TAMP development through a combination of stewardship and oversight. Paul closed by encouraging workshop participants to continue attending webinars, workshops, and peer exchanges.

Bill Robert began by reviewing the current inventory and condition of assets in Caltrans' TAMP, focusing mainly on pavements and bridges. Bill highlighted the disparity in condition between Caltrans-owned and locally-owned pavements and bridges. He presented slides showing examples of pavement condition on Fulton Street in San Francisco, Wilshire Boulevard in Los Angeles, and Highway 101.

Gina Coates discussed Caltrans' funding overview. The Statewide Transportation Improvement Program (STIP) Fund Estimate, a biennial forecast of all resources available for a five-year period, establishes the funding level for STIP and SHOPP. The Fund Estimate, developed by Caltrans in consultation with the Commission, provides funding capacity which drives project programming. Fund Estimates are done for the STIP, SHOPP, Active Transportation Program, and the Transit and Intercity Rail Program. Drafts of the Fund Estimate are submitted every odd year in

August. Gina showed slides of SB1 resources illustrating the calculations in the final 2018 draft Fund Estimate for August 2017. She highlighted how SB1 funding is split between state and local level and focused on "Fix it First" practices. Showing a slide of the estimated average annual funding over the next ten years, she explained that after 2017 or 2018, the program will stabilize and the revenue will increase every year. Over the next ten years, there is an estimated $26 billion in funding for locals and $25.8 billion for the state.

Following Gina's presentation, Mike Johnson offered two vignettes highlighting the differences in the funding distribution process between Caltrans and a local agency; he emphasized it is difficult to generalize about NHS assets for the TAMP. He then presented the slides on SHOPP funding and the project prioritization tool. Mike reviewed the state's asset needs over the next decade and the strategy to distribute funding between districts by performance rather than by dollar value.

A workshop participant asked what happens when a district combines a pavement project for Caltrans with a local agency. Mike responded that sometimes a local agency can identify needs and share it with Caltrans. This could be an issue to include in the improvement plan: better coordination with locals to identify opportunities to improve asset performance. There was another question on the different definitions of good, fair, or poor for other assets; Mike responded that Caltrans has a basis for those definitions in the Highway System Management Plan. Bill Robert then presented the pre- SB 1 local pavement and bridge spending overview, as well as estimated spending with SB1.

Following the funding overview, Sui Tan from MTC presented the MPO's asset management perspective. (Six workshop attendees represented MPOs; four the local or city level.) Sui went over MTC's scope and their new pavement management software. Sui presented MTC's 28-Year Needs Assessment, noting that getting local agency revenue estimates is challenging. He also discussed adopting outcome-driven performance measures, shifting to preventive maintenance rather than a "worst first" practice. Sui presented two performance indicators: a Pavement Preservation Index and an Asset Sustainability Index. He cited the Napa Countywide Road Maintenance Act as an example of effective communication of funding needs to the public: 75% of voters voted 'Yes' to approve a new sales tax to fund road repairs.

Mike asked how MTC combines all local agency results to get a single, MTC-wide number. According to Sui, locals have different decision trees. MTC aggregates the local numbers based on unit cost data and individual decisions trees. MTC is moving towards the performance-driven model and distributing funds to the county level. A local agency representative commented Caltrans is trying to manage NHS

performance, but local agencies have differing priorities. Sui responded NHS has to be the focus, because locals receive federal funding and the NHS sees the heaviest use.

Following Sui's presentation, Bill reviewed national performance measure rules and TAMP requirements regarding targets and projections for Caltrans and locally-owned NHS assets. Bill displayed potential ten-year targets based on Commission targets for Caltrans assets. He showed expected funding as well as funding required to meet targets. This presentation is available in Appendix B.

Small Group Exercise: Investment Prioritization

The workshop used a small group exercise to generate responses and recommendations for the investment prioritization process. Attendees were split into groups of three, including at least one MPO/local representative in each group.

A handout (Appendix C) was provided to each group with five questions:

1. Do you agree with the approach that has been presented? If not, what concerns do you have?
2. What should be done in the future to improve the ability to make better investment decisions for the locally owned NHS pavement and bridge assets?
3. What are the current performance projections telling us?
4. Are there tradeoffs across assets that would make the overall network better?
5. Is the development of the TAMP financial plan and investment strategies going to be used for awareness building or will it be linked to your planning and programming process to guide specific investments?

Each group assigned a scribe to note the group's decisions and report them to the full workshop. Following the group exercise, participants gathered to share responses. All responses, concerns, or questions that appeared in multiple groups or resonated with workshop participants were written on whiteboards as important responses. Table 1 below shows the 13 important responses, concerns, and questions gathered from the investment prioritization exercise.

Table 1. Investment Prioritization Exercise Results Summary

Top Responses, Concerns, and Questions
• Some workshop participants would prefer a "bottom-up" approach to better account for local needs in setting targets – MTC will soon be able to do this after matching NHS routes to local network
• Concern about network-level deterioration rates
• How to carry priorities for NHS through to local level? – Perhaps start discussion with Councils of Governments (COGs) – MPO/Regional Transportation Planning Agencies (RTPA) Level workshops
• Caltrans needs to lead the effort to standardize pavement condition evaluation. Locals can't be expected to "throw out old system" (Present Serviceability Rating (PSR) vs. Pavement Condition Index (PCI))
• Need for additional review of trends in Good/Fair/Poor (G/F/P) condition for bridges
• Need for increased information sharing between agencies (e.g. agencies bordering each other)
• Common permitting process is an area of need
• Calculation of pavement condition and comparison of FHWA G/F/P measure with PSR
• Challenges in obtaining data on highway spending specific to the NHS. (Note: At least in the case of Bakersfield it is possible to obtain these data.)
• The numbers indicate that we need more pavement preservation on local system relative to current investment levels, though some participants would have expected lower bridge needs relative to pavement needs
• Opportunities for tradeoffs: – Perhaps urban areas should focus more on transit/Vehicle Miles Traveled (VMT) reduction – Need to consider broader goals besides improving pavement and bridge conditions – Preservation vs. rehab – need to find right balance – Tradeoffs with Americans with Disabilities Act (ADA), complete streets, retroreflectivity objectives
• Relationship to TAMP will likely be another factor in project selection – Southern California Association of Governments (SCAG) using local needs assessment as part of Regional Transportation Plan (RTP) development. Likewise TAMP can be used in this way – MTC: TAMP useful for awareness building, but need to tie to local needs
• Need to revise the Local Assistance Procedures Manual (LAPM) to reflect desired practice

Workshop Wrap-Up

During the workshop, participants reviewed financial planning and investment strategy concepts; reviewed current asset inventory, condition, and performance projections; discussed potential funding and spending scenarios; and performed an investment prioritization exercise.

Mike Johnson concluded with the following remarks. Caltrans is not opposed to a bottom-up approach to financial planning in the TAMP; a similar approach may need to be included in subsequent plans, given the effort needed for local data collection. He recognized the need for more consistent approaches between different stakeholders. Mike noted that if participants are interested in target-setting, there will be a separate meeting focused on that. Mike thanked participants for attending the workshop and encouraged everyone to attend the next workshop.

3. Workshop Attendees

Table 2 lists the workshop attendees. As documented in the table, participants included staff from the Commission, Caltrans, MPOs, RTPAs, cities, counties, and FHWA.

Table 2. Financial Plan & Investment Strategies Workshop Attendees

Name	Organization
Maura Twomey	Assoc. of Monterey Bay Area Governments (AMBAG)
Linda Khamoushian	California Bicycle Coalition
Dennis Agar	Caltrans
Mitchell Baker	Caltrans
Abdelrahman Beshari	Caltrans
Gina Coates	Caltrans
Helena Culik-Caro	Caltrans
Jennifer Duran	Caltrans
Rob Effinger	Caltrans
Jean Finney	Caltrans
Dawn Foster	Caltrans
Ina Gerhard	Caltrans
John Gillis	Caltrans
Michael B. Johnson	Caltrans
Kathy Karroubi	Caltrans
Yi-Liang Kao	Caltrans

Name	Organization
Parviz Lashai	Caltrans
Adrian Levy	Caltrans
Aung Maung	Caltrans
Celia McCuaig	Caltrans
Brad Mettam	Caltrans
Ron Moriguchi	Caltrans
Doanh Nguyen	Caltrans
Jeffrey Nguyen	Caltrans
Sean Nozzari	Caltrans
Mark Powers	Caltrans
Phillip Rodriguez	Caltrans
Hamid Sadraie	Caltrans
Nick Saleh	Caltrans
Louis Schuman	Caltrans
Phil Stolarski	Caltrans
Karla Sutliff	Caltrans
Melissa Thompson	Caltrans
Chun Tsung	Caltrans
Nidal Tuqan	Caltrans
Fariba Zohoury	Caltrans
Kristina Budak	City of Bakersfield
Roani Sandoval	City of Bakersfield
Brian Balbas	Contra Costa County
Steve Healow	Federal Highway Administration (FHWA)
Chris Long	Federal Highway Administration (FHWA)
Paul Schneider	Federal Highway Administration (FHWA)
Jennifer Soliz	Fresno Council of Governments (FCOG)
Jim Daly	Los Angeles County
Sui Tan	Metropolitan Transportation Commission (MTC)
Sarkes Khachek	Santa Barbara County Assoc. of Governments (SBCAG)
Bruce Abanathie	Santa Clara Valley Transportation Authority (SCVTA)
David Mulenga	Santa Clara Valley Transportation Authority (SCVTA)
James Cameron	Sonoma County Transportation Authority (SCTA)
John Asuncion	Southern California Assoc. of Governments (SCAG)
Daniel Tran	Southern California Assoc. of Governments (SCAG)
Warren Whiteaker	Southern California Assoc. of Governments (SCAG)
Gabriel Gutierrez	Tulare County Association of Governments (TCAG)
John Hummer	U.S. DOT - Maritime Administration
Hyun-A Park	Spy Pond Partners
Bill Robert	Spy Pond Partners

4. Background

4.1 Federal Requirements

FHWA recently released a series of rules initiated by MAP-21. The TAMP rule is most relevant to the current project. Finalized on October 24, 2016, it requires state Departments of Transportation (DOT) develop TAMPs detailing their asset inventory, current conditions, and predicted future conditions over a ten-year period (using performance measures detailed in the pavement and bridge performance management rules, respectively).[1] Also, the TAMP should describe the agency's investment plan, address life cycle policies used to manage an agency's assets, and discuss how risk is managed. The plan should include pavement and bridges on the NHS at a minimum, but may include additional assets and/or systems.

FHWA now requires a financial plan and investment strategies as part of TAMP development. Following is an overview of the new requirements.

- Development of a ten-year (minimum) financial plan including:
  - Estimated cost of future work by work type and state fiscal year
  - Estimated funding levels expected to be reasonably available by fiscal year
  - Identification of anticipated funding sources
  - Estimated asset value and needed annual investment to maintain asset value
- Development of investment strategies to support progress towards national performance goals, including a description of how investment strategies are influenced by other TAM processes

4.2 State Requirements

Caltrans is required by California state law Senate Bill 486 (SB 486) to develop a TAMP and to establish goals and performance measures for the State Highway System (SHS). Specifically, the law mandates Caltrans, in consultation with the Commission, prepare a "robust asset management plan" to guide project selection for the SHS. This asset management plan must be consistent with federal law and adopted by the Commission.

1 Federal Rule Making for Asset Management Plans, https://www.regulations.gov/document?D=FHWA-2013-0052-0064

For purposes of this requirement, asset management projects are limited to maintenance, safety, operation, and rehabilitation of state highways and bridges that do not add a new traffic lane to the system.

4.3 Scope of the California TAMP

Based on the above federal and state legislative requirements, California's TAMP must include the full NHS (including local NHS routes) as well as the complete SHS. Specifically, Caltrans has determined the TAMP will include:

- State-owned pavement, as well as other pavement on the NHS
- State-owned bridges, as well as other bridges on the NHS
- State owned culverts
- State owned Intelligent Transportation System (ITS) assets

The NHS consists of roadways important to the nation's economy, defense, and mobility. It includes the Interstate Highway System as well as other roads serving major airports, ports, rail or truck terminals, railway stations, pipeline terminals and other strategic transport facilities. The NHS was developed by the US Department of Transportation in cooperation with states, local officials, and metropolitan planning organizations (MPOs).

The California SHS is a network of highways owned and maintained by Caltrans.

Appendix A. Workshop Agenda

June 14, 2017 • Caltrans District 4

Financial Plan & Investment Strategies Workshop

Workshop Purpose

- Develop a common understanding of FHWA requirements for TAMP financial plans and investment strategies
- Review funding assumptions for California's roads and bridges on the National Highway System (NHS)
- Review projections of future asset conditions
- Determine how best to project conditions and funding levels for National Highway System assets owned by Caltrans and other agencies
- Determine asset investment priorities

Welcome and Introductions

8:00 AM Workshop Welcome and Introductions

8:15 AM TAMP Requirements

Assets, Funding, Targets, and Projections

8:30 AM Asset Inventory and Conditions
- Caltrans assets
- Local pavement and bridge assets

9:00 AM Transportation Funding
- California transportation funding overview
- SHOPP funding and allocation process
- Assumptions concerning local NHS funding

9:30 AM MPO Asset Management Perspective

10:00 AM Asset Condition Targets & Projections

10:15 AM Break

Small Group Exercise: Investment Prioritization

10:30 AM Investment Prioritization Exercise (focus is on the locally owned NHS)
- Organize into to groups of 3 with at least one MPO/local agency representative in the group
- Answer the questions in the exercise handout

11:00 AM Group Reports and Discussion
- Share small group results and discuss improvements needed in the future

Workshop Wrap Up

11:50 AM Summary of Workshop Results and Next Steps

Appendix B. Workshop Presentation

Financial Plan & Investment Strategies Workshop

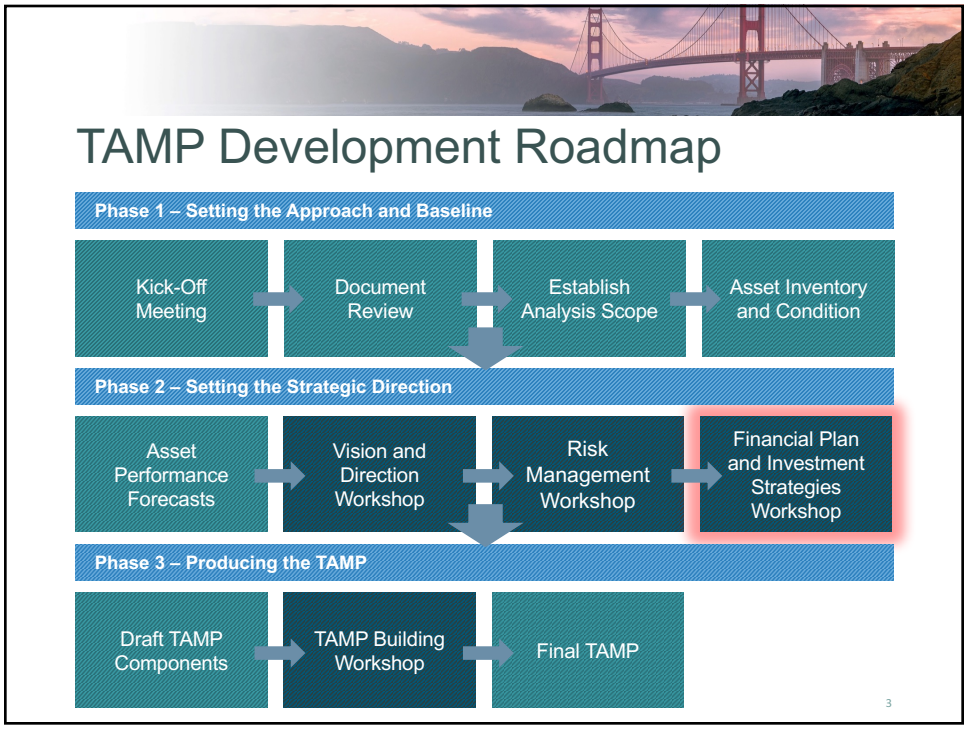
California Transportation Asset Management Plan (TAMP)

June 14, 2017

spy pond partners, llc

Welcome and Introductions

California TAMP
Financial Plan &
Investment Strategies
Workshop


TAMP Development Roadmap
Phase 1 – Setting the Approach and Baseline
Kick-Off Meeting
Document Review
Establish Analysis Scope
Asset Inventory and Condition
Phase 2 – Setting the Strategic Direction
Asset Performance Forecasts
Vision and Direction Workshop
Risk Management Workshop
Financial Plan and Investment Strategies Workshop
Phase 3 – Producing the TAMP
Draft TAMP Components
TAMP Building Workshop
Final TAMP
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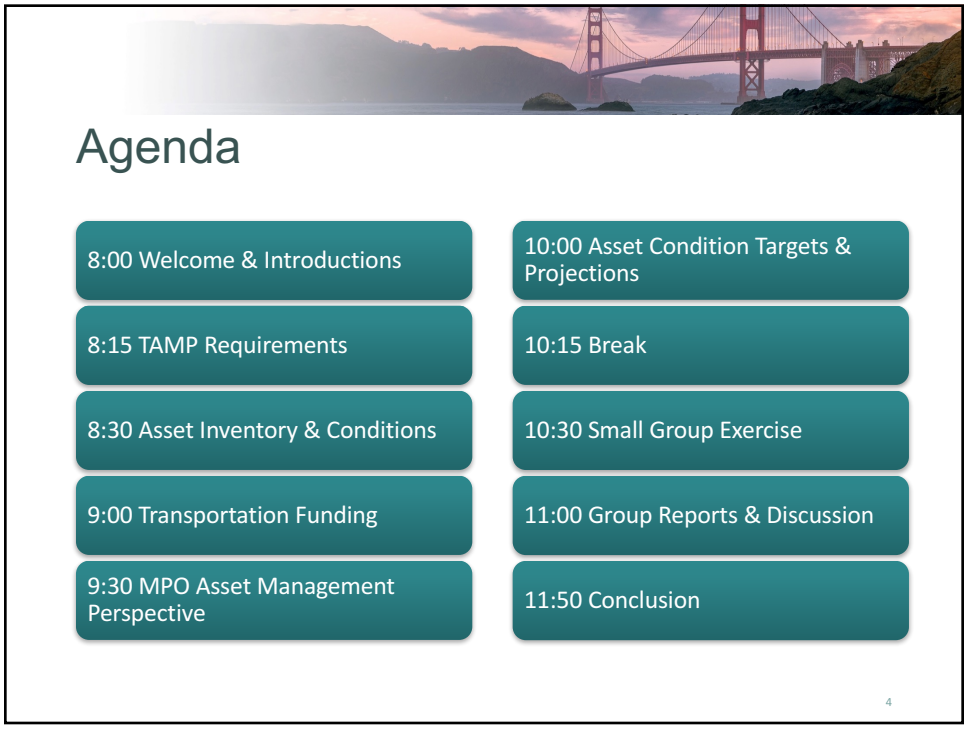
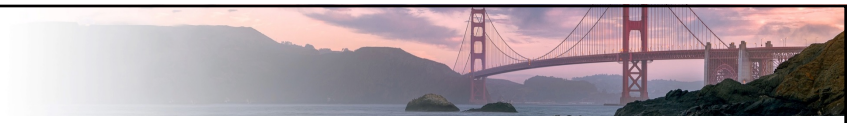

Agenda
8:00 Welcome & Introductions
8:15 TAMP Requirements
8:30 Asset Inventory & Conditions
9:00 Transportation Funding
9:30 MPO Asset Management Perspective
10:00 Asset Condition Targets & Projections
10:15 Break
10:30 Small Group Exercise
11:00 Group Reports & Discussion
11:50 Conclusion
4



Workshop Objectives

- Develop a common understanding of Federal Highway Administration (FHWA) requirements for TAMP financial plans and investment strategies
- Review funding assumptions for California's roads and bridges on the National Highway System (NHS)
- Review projections of future asset conditions
- Determine how best to project conditions and funding levels for NHS assets owned by Caltrans and other agencies
- Determine asset investment priorities

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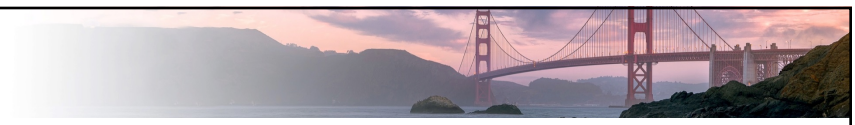
TAMP Requirements

California TAMP Financial Plan & Investment Strategies Workshop



TAMP Requirements

California law Senate Bill 486 (SB486) requires Caltrans to develop a "robust" asset management plan consistent with federal requirements

FHWA TAMP Requirements (initiated by Moving Ahead for Progress in the 21st Century (MAP-21))

- All states must prepare a TAMP by April 30, 2018
- Needs to incorporate a 10-year time-frame
- Must include NHS pavements and bridges at a minimum
- May include additional asset classes
- Must use pavement and bridge measures specified separately

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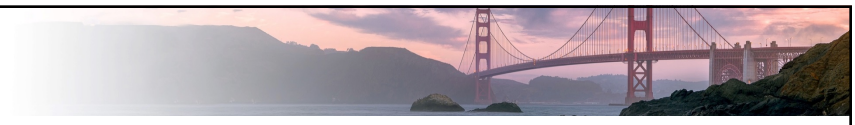

What is the NHS?

The Interstate Highway System plus additional roads are important to the nation's economy, defense and mobility

California

51,586 lane miles

15,093 road miles

Nationwide

Approximately 160,000 road miles

Includes 4% of U.S. roads, but 40% of annual daily traffic

Essentially includes all principal arterials and higher functional classes

History

Initially defined in 1991 through ISTEA

Expanded to include all principal arterials and selected other routes in 2012

2012 expansion approximately doubled the system for CA

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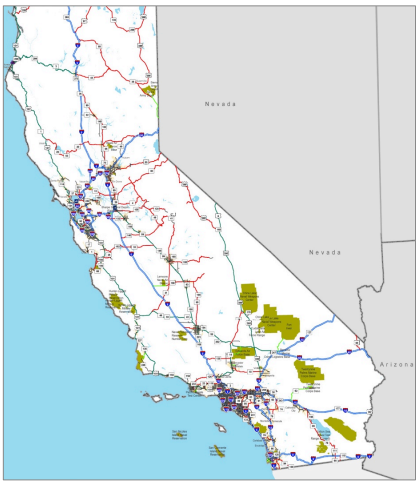
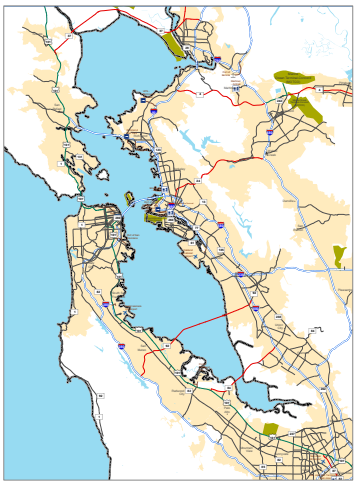
NHS – Statewide and Bay Area





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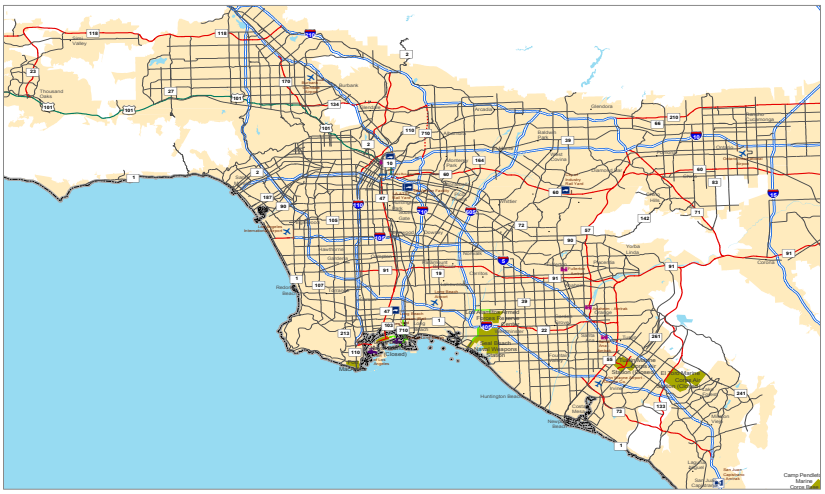
NHS – Los Angeles Area



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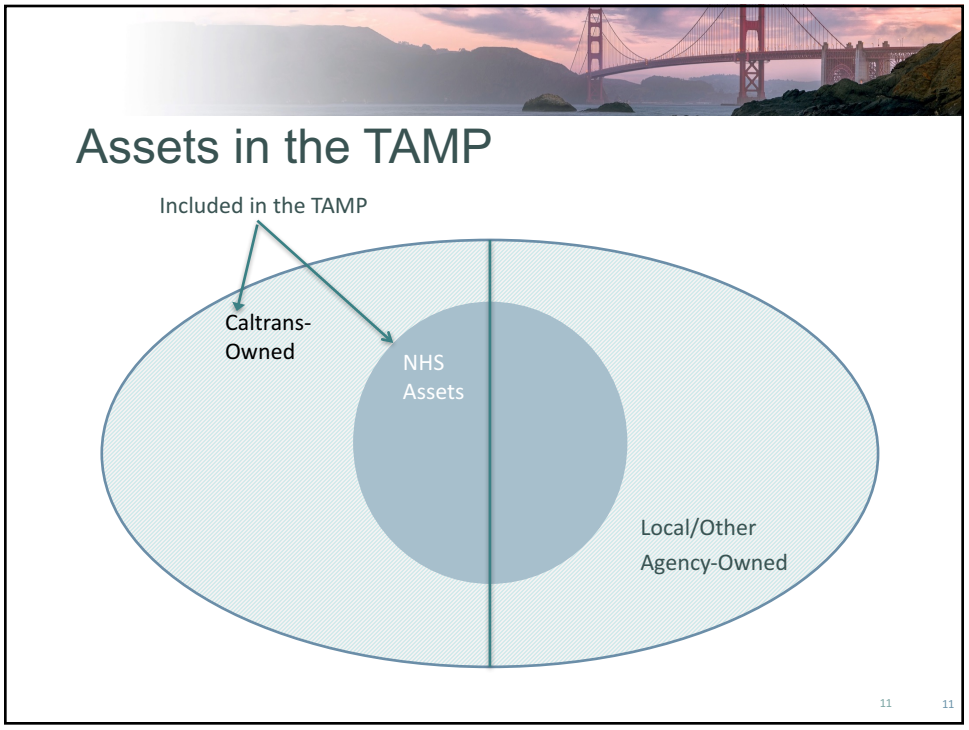
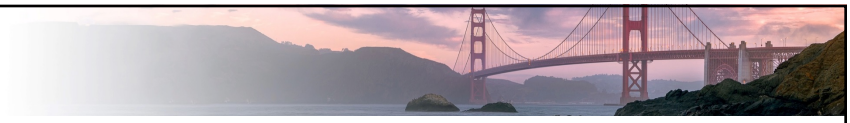

Assets in the TAMP
Included in the TAMP
Caltrans-Owned
NHS Assets
Local/Other Agency-Owned
11
11


Required TAMP Contents
Asset Management Objectives
Asset Management Measures and Targets
Inventory and Conditions
Performance Gap Identification
Life-Cycle Planning
Risk Management Analysis
Financial Plan
Investment Strategies
12
12



Relevant Process Requirements

- Financial Plan Development
  - Estimate future cost by work type
  - Identify funding sources
  - Estimate available funding
  - Estimate asset value
  - Estimate investment needed to maintain value
- Investment Strategies Development
  - Describe how investments are influenced by financial plan development and other processes
- Risk assessment should be considered in developing the TAMP financial plan and investment strategies

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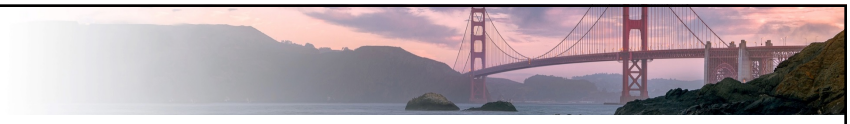

Key Challenges

NHS focus

- Need to address all NHS pavements and bridges regardless of owner
- Implies significant coordination between numerous stakeholders
- In the past we have not tracked NHS spending or set targets for the NHS

Performance measures

- FHWA requires use of the performance measures specified in the performance measures rule (PM2) (finalized in January 2017 and recently took effect)
- New pavement measure is calculated differently for existing Caltrans and local agency measures

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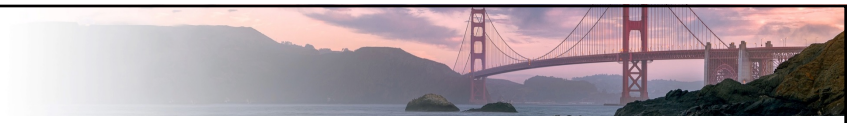

Key Challenges (continued)

Defining goals and objectives for the TAMP

- Discussed previously at the Goals and Objectives Workshop
- Caltrans' strategic goals are very broad
  - Preserve the Existing Transportation Infrastructure
  - Improve the Safety of the Transportation System
  - Support State Environmental Goals
  - Support a Vibrant Economy
  - Foster Livable and Healthy Communities
- CA local agencies and other stakeholders may have different goals
- Transportation investments should support all of these goals – not simply improve asset conditions
- Difficult to develop measures and data reflecting the full range of goals – even quantifying asset conditions is a challenge

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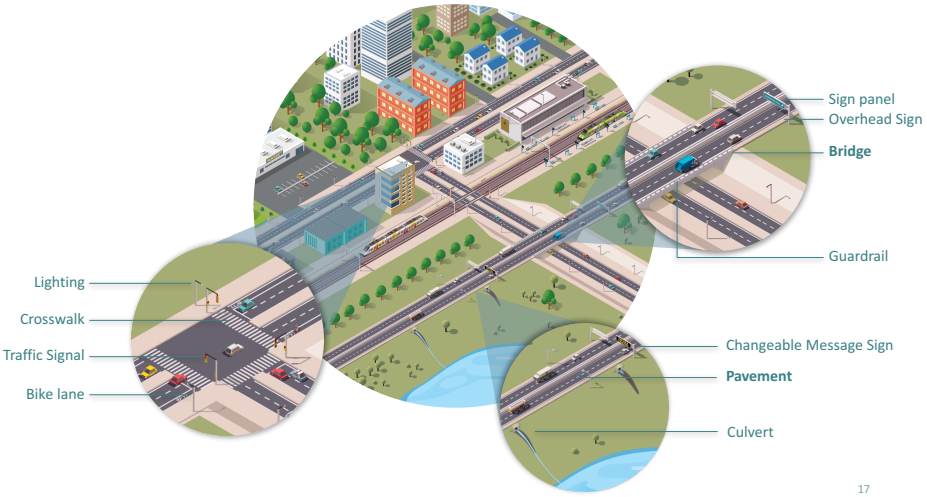
Asset Inventory & Conditions

California TAMP Financial Plan & Investment Strategies Workshop

Typical Roadway Assets



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Assets in the TAMP

The Caltrans TAMP will include

- Pavement: all Caltrans and all on the NHS regardless of owner
- Bridges: all Caltrans and all on the NHS regardless of owner
- Drainage systems: Caltrans only
- Transportation Management Systems: Caltrans only

Subsequent versions of the TAMP are expected to cover additional asset classes

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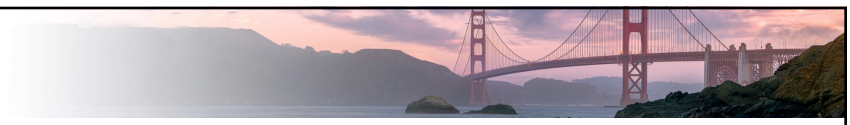

Pavement

- Includes the paved surfaces for mainline roads
- FHWA has defined a good/fair/poor measure in PM2 considering the following distresses
  - International Roughness Index (IRI)
  - Cracking
  - Rutting (asphalt only)
  - Faulting (concrete only)
- Present Serviceability Rating (PSR) may be used as an alternative for lower speed roads
- Conditions calculated every 1/10 mile using data reported to the Highway Performance Monitoring System (HPMS)

Source: Caltrans

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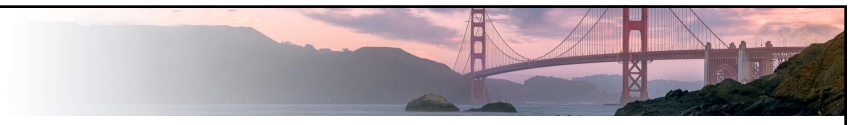
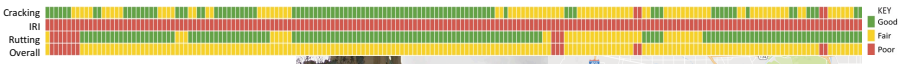
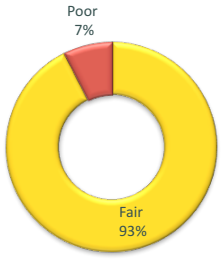
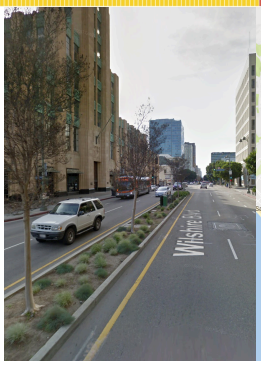
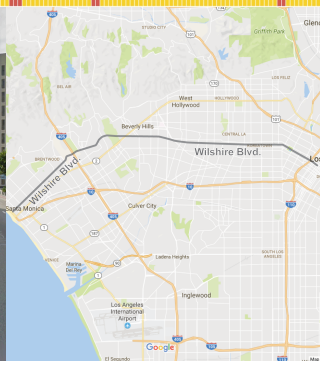


Wilshire Blvd Pavement Conditions



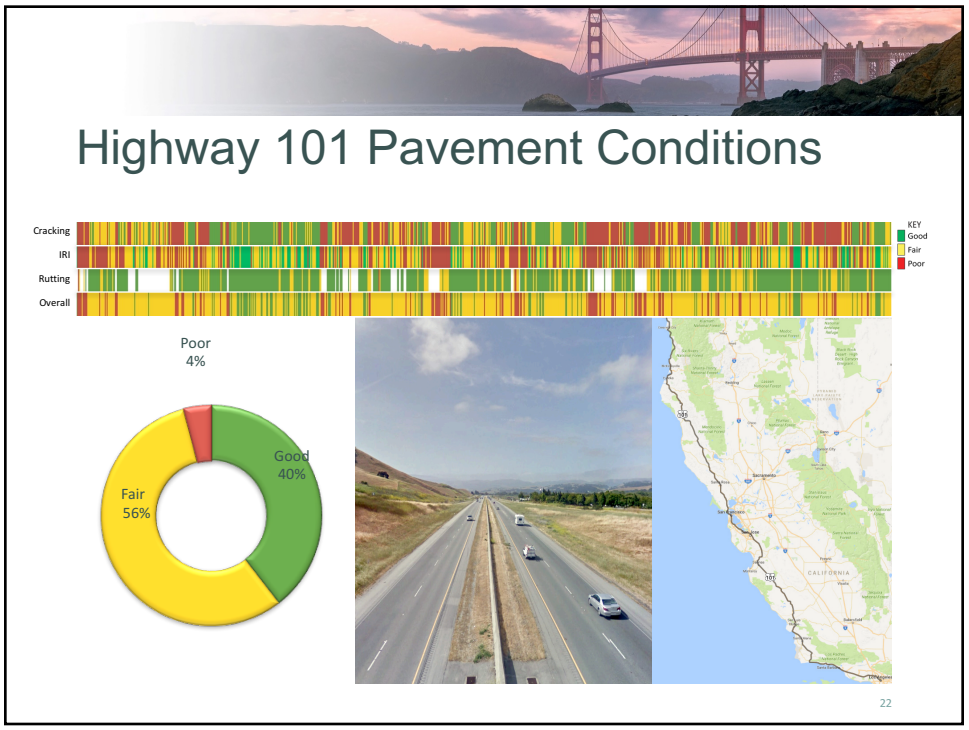






20


Fulton Street Pavement Conditions
Cracking
IRI
Rutting
Overall
KEY
Good
Fair
Poor
Poor
10%
Fair
90%
Fulton St.
Fulton St.
21


Highway 101 Pavement Conditions
Cracking
IRI
Rutting
Overall
KEY
Good
Fair
Poor
Poor
4%
Good
40%
Fair
56%
22

California Pavement Inventory

Owner	NHS	Road Miles	Lane Miles
Caltrans	NHS	8,693	38,435
	Non-NHS	6,400	13,252
	Total	15,093	51,686
Local	NHS	5,418	19,088
	Non-NHS	163,143	339,414
	Total	168,561	358,502
Other*	NHS	9	24
	Non-NHS	12,130	24,284
	Total	12,139	24,308
Total	NHS	14,120	57,547
	Non-NHS	181,673	376,950
	Total	195,793	434,497

Source: 2015 HPMS **Includes federal and tribal roads*

Source: 2015 HPMS

23

California Pavement Conditions

Owner	NHS	Road Miles	Lane Miles	% Good	% Fair	% Poor
Caltrans	NHS	8,693	38,435	39	57	4
	Non-NHS	6,400	13,252	44	44	11
	Total	15,093	51,686	41	53	6
Local/Other	NHS	5,427	19,112	3	85	12
All	NHS	14,120	57,547	27	66	6

Source: 2015 HPMS (NHS), Caltrans SHSMP (non-NHS)

Source: 2015 HPMS (NHS) Data, Caltrans SHSMP (Non-NHS)

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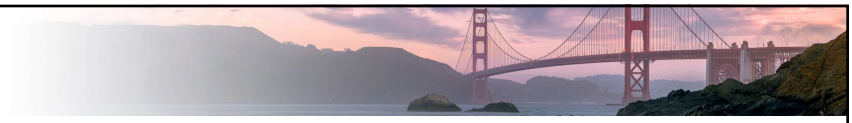

Bridges

- Includes all highway bridges in the National Bridge Inventory (NBI) – length of 20 feet or more
- FHWA has defined a good/fair/poor measure in PM2 considering NBI condition ratings
  - Use minimum of deck, super, sub and culvert ratings
  - Bridge is good if rating >7, poor if <4, otherwise fair
- Poor similar to Structurally Deficient (SD)
  - Definition of SD changes to match Poor
- Calculations weighted by deck area

Source: Caltrans

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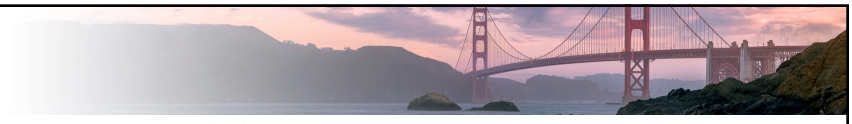


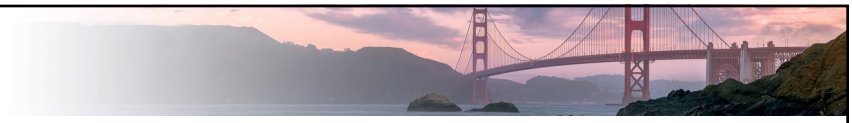
California Bridge Inventory

Owner	NHS	Count	Deck Area (mil. sq ft)
Caltrans	NHS	9,174	203.8
	Non-NHS	3,195	41.1
	Total	12,369	244.9
Local	NHS	1,590	22.6
	Non-NHS	10,570	47.1
	Total	12,160	69.7
Other	NHS	32	1.1
	Non-NHS	844	3.2
	Total	876	4.3
Total	NHS	10,796	227.5
	Non-NHS	14,609	91.3
	Total	25,405	318.8

Source: 2016 NBI

Source: 2016 NBI

26



California Bridge Conditions

Owner	NHS	Count	Deck Area (mil. sq ft)	% Good	% Fair	% Poor
Caltrans	NHS	9,174	203.8	74	23	3
	Non-NHS	3,195	41.1	66	32	2
	Total	12,369	244.9	73	24	3
Local/Other	NHS	1,622	23.7	42	42	16
All	NHS	10,796	227.5	71	25	4

Source: Caltrans (as of January 2017)

Source: Caltrans (as of January 2017)

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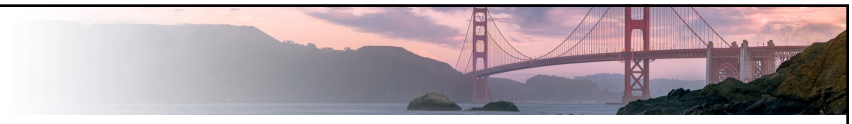
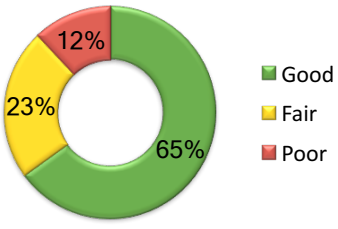


Drainage Systems

- Culverts and pipes with a span of less than 20 feet
- 10,647,970 linear feet inventoried
- Estimated 20,275,500 linear feet total
- Current condition:



Source: Caltrans

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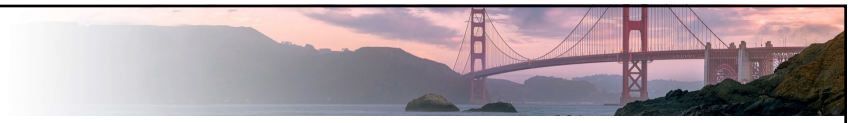
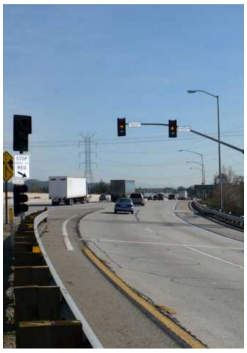


Transportation Management Systems

- Includes 18,837 Intelligent Transportation System (ITS) components and other traffic control devices
  - Changeable message signs
  - Traffic signals
  - Ramp meters
  - Highway advisory radio
  - Cameras
  - Traffic detectors
- 58.83% in good condition, 41.17% poor



Source: Caltrans

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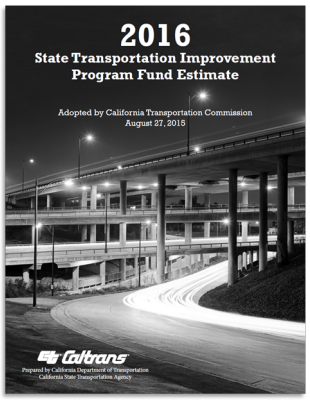
Transportation Funding

California TAMP Financial Plan & Investment Strategies Workshop

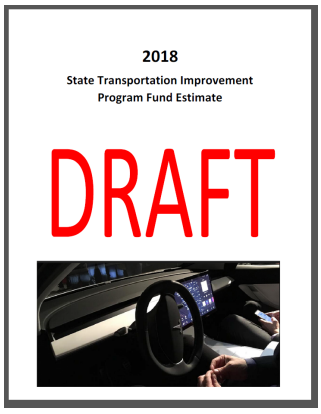
2016 Fund Estimate



- Pre-SB 1 Only
- Makes revenue projections pertinent to the STIP and SHOPP
- Deducts ongoing commitments
- Estimates available capacity for new projects

31

2018 DRAFT Fund Estimate



- Includes SB 1 resource for Maintenance & Repair
- Includes updated assumptions
- DRAFT submitted later this month
- Adoption scheduled for August 2017

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Senate Bill 1 (SB 1)

Estimated Funding Next 10 Years	
LOCALS	STATE
$26 Billion	$25.8 Billion

- Focuses on "Fix it First"
- Splits Funding equally between State and Locals
- Constitutional Amendment
- Ensures Accountability and Transparency

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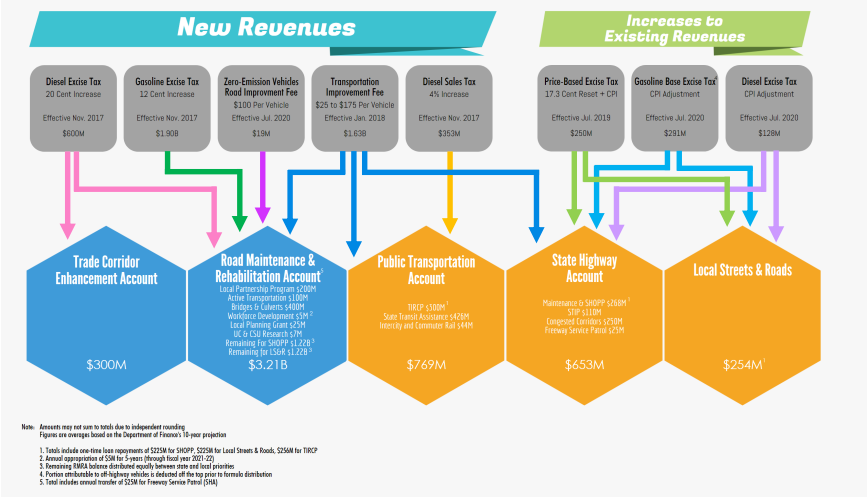
SB 1 – Revenue Distribution



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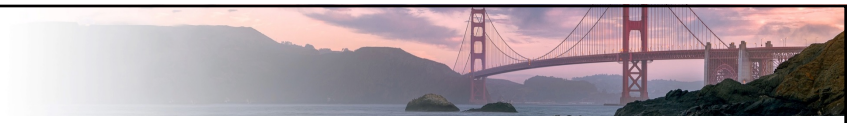


Performance Management
Analysis Tool

Pavement Class I

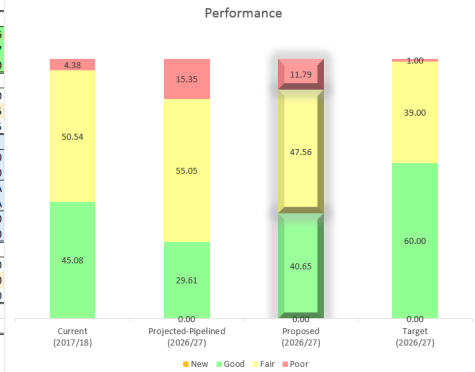
Unit = Lane Miles

% of the performance gap which is closed		Quantity Left	Quantity Fixed
Poor	24.81	2,806	926
Fair	42.32	2,651	1,947
New	0	0	0

Goal Constrained (GC)	First 5 Years	Last 5 Years	Sum
Maintenance	$0	$67,866,480	$67,866,480
SHOPP	$3,647,432,450	$8,904,525,795	$12,551,958,245
Maintenance & SHOPP	$3,647,432,450	$8,972,392,275	$12,619,824,725

Last 5 Years	Maint Fair	SHOPP Fair	SHOPP Poor	SHOPP New
GC Fixed	552	4,046	3,732	0
GC Cost	$67,866,480	$3,676,389,387	$5,228,136,408	$0
Keep Curr Fixed	141	1,031	2,852	NA
Keep Curr Cost	$17,298,720	$937,087,508	$3,995,349,688	NA
FC Fixed	994	953	926	0
FC Cost	$122,262,000	$865,441,206	$1,297,227,844	$0

Fiscally Constrained (FC)	First 5 Years	Last 5 Years	Sum
Maintenance	$0	$122,262,000	$122,262,000
SHOPP	$3,647,432,450	$2,162,669,050	$5,810,101,500
Maintenance & SHOPP	$3,647,432,450	$2,284,931,050	$5,932,363,500
2026/27 Inventory	26,014		Lane Miles
2026/27 Inventory Value	$34,432,130,400		
Ratio of FC SHOPP 10 Year Plan Investment to 2026/27 Inventory Value	17%		



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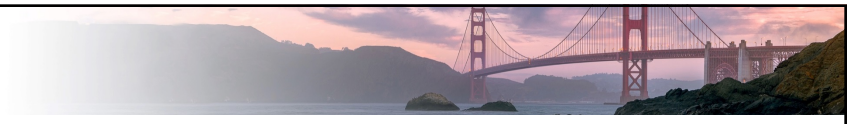
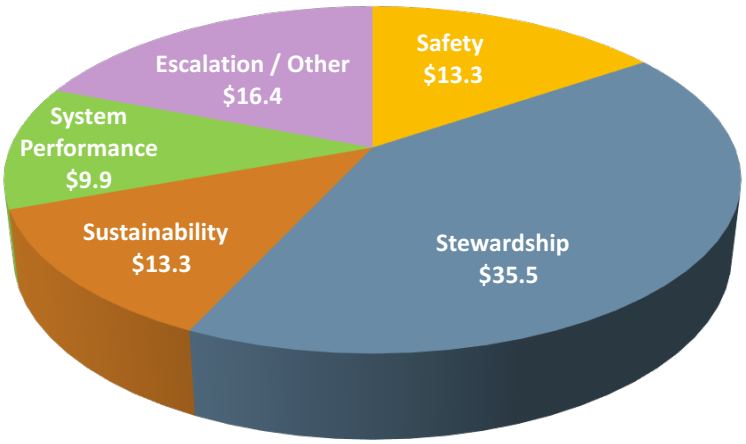


Balancing Investment

Objectives	SHOPP Needs Assessment			SHOPP Investment Plan				Investment Plan / Needs Assessment
	Pipelined Projects	Performance Gap	Sum	Pipelined Projects	Remaining Performance	Sum	% of the Sub Total	
Safety	$3,100,137,900	$10,232,921,145	$13,333,059,045	$3,100,137,900	$2,374,835,920	$5,474,973,820	13.24%	41%
Bridge Rail Replacement and Upgrade	$314,194,000	$5,882,828,875	$6,197,022,875	$314,194,000	$92,619,450	$406,813,450	0.98%	7%
Collision Severity Reduction	$718,968,000	$605,438,400	$1,324,406,400	$718,968,000	$484,381,800	$1,203,349,800	2.91%	91%
Roadside Safety Improvements	$496,886,100	$1,104,743,670	$1,601,629,770	$496,886,100	$367,834,670	$864,720,770	2.09%	54%
Safety Improvements	$1,570,089,800	$2,639,910,200	$4,210,000,000	$1,570,089,800	$1,430,000,000	$3,000,089,800	7.25%	71%
Stewardship	$9,476,495,001	$26,052,081,604	$35,528,576,605	$9,476,495,001	$20,731,849,561	$30,208,344,562	73.04%	85%
Bridge Health	$2,302,570,000	$3,182,138,398	$5,484,708,398	$2,302,570,000	$3,167,656,761	$5,470,226,761	13.23%	100%
Drainage Pump Plants	$43,995,000	$120,930,000	$164,925,000	$43,995,000	$75,690,000	$119,685,000	0.29%	73%
Drainage System Restoration	$301,421,000	$2,265,476,000	$2,566,897,000	$301,421,000	$2,016,276,000	$2,317,697,000	5.60%	90%
Lighting Rehabilitation	$0	$602,229,600	$602,229,600	$0	$150,595,200	$150,595,200	0.36%	25%
Major Damage (Emergency Opening)	$420,000,000	$1,105,000,000	$1,525,000,000	$420,000,000	$1,105,000,000	$1,525,000,000	3.69%	100%
Major Damage (Permanent Restoration)	$530,930,000	$804,000,000	$1,334,930,000	$530,930,000	$650,000,000	$1,180,930,000	2.86%	88%
Office Buildings	$0	$491,225,085	$491,225,085	$0	$31,339,459	$31,339,459	0.08%	6%
Overhead Sign Structures Rehabilitation	$0	$480,960,000	$480,960,000	$0	$120,576,000	$120,576,000	0.29%	25%
Pavement Class I	$3,647,432,450	$8,904,525,795	$12,551,958,245	$3,647,432,450	$8,868,335,650	$12,515,768,100	30.26%	100%
Pavement Class II	$1,675,788,481	$3,294,704,920	$4,970,493,401	$1,675,788,481	$3,273,755,010	$4,949,543,491	11.97%	100%
Pavement Class III	$197,159,070	$988,103,300	$1,185,262,370	$197,159,070	$984,162,250	$1,181,321,320	2.86%	100%
Relinquishments	$15,600,000	$13,000,000	$28,600,000	$15,600,000	$13,000,000	$28,600,000	0.07%	100%
Roadway Protective Betterments	$108,068,000	$358,560,000	$466,628,000	$108,068,000	$34,860,000	$142,928,000	0.35%	31%
Safety Roadside Rest Area (SRRA) Rehabilitation	$45,000,000	$1,147,140,000	$1,192,140,000	$45,000,000	$96,000,000	$141,000,000	0.34%	12%
Transportation Related Facilities	$122,178,000	$2,264,864,346	$2,387,042,346	$122,178,000	$135,835,983	$258,013,983	0.62%	11%
Water and Wastewater Treatment at SRRAs	$66,353,000	$29,224,160	$95,577,160	$66,353,000	$8,767,248	$75,120,248	0.18%	79%

36

SHOPP Needs Assessment - $86.5 B



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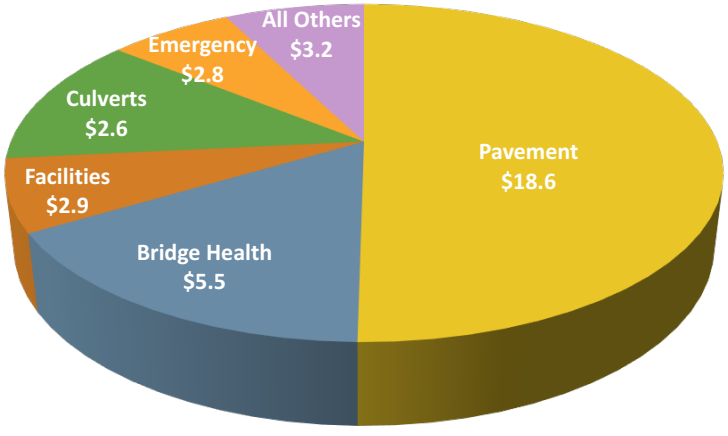
SHOPP Stewardship Needs

(Unescalated)

10 Year Needs (Billions)



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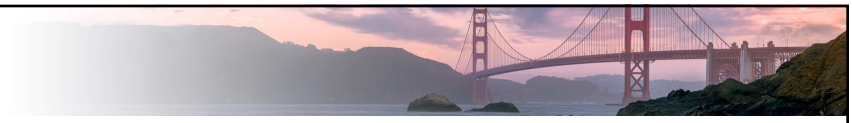

District Performance Plans

SHOPP Performance Plan - District 11

Objectives	Unit	Current Inventory / Need	Current Condition			SHOPP Investment Plan									Projected Condition 2027			Poor % 2027	
						Pipelined Projects			Remaining Performance			Sum							
			Good	Fair	Poor	Fair	Poor	New	Fair	Poor	New	Fair	Poor	New	Good	Fair	Poor	District	State
Safety																			
Bridge Rail Replacement and Upgrade	Linear Feet	945,635	606,372	324,340	14,923	7,168	7,311	-	0	837	-	7,168	8,148	-	621,688	317,172	6,775	0.7%	4.7%
Collision Severity Reduction	Injuries	4,827	-	-	4,827	-	47	-	-	349	-	-	396	-	396	-	4,431	91.8%	91.4%
Roadside Safety Improvements	Locations	2,263	-	-	2,263	-	433	-	-	609	-	-	1,042	-	1,042	-	1,221	54.0%	49.3%
Safety Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stewardship																			
Bridge Health	SF	25,492,125	19,180,734	5,466,834	844,557	1,292,863	559,368	-	477,143	312,820	-	1,770,006	872,188	-	20,959,795	4,149,948	382,382	1.5%	1.5%
Drainage Pump Plants	Locations	5	4	1	0	0	0	-	0	0	-	0	0	-	3	2	0	0.0%	9.3%
Drainage System Restoration	Linear Feet	1,541,632	1,156,849	273,583	111,200	170	12,008	-	0	76,665	-	170	88,673	-	1,739,281	893,084	303,013	10.3%	10.6%
Lighting Rehabilitation	Each	6,574	3,476	2,852	246	0	0	-	0	437	-	0	437	-	3,291	1,974	1,309	19.9%	39.9%
Major Damage (Emergency Opening)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Damage (Permanent Restoration)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Office Buildings	SF	0	0	0	0	0	0	-	0	0	-	0	0	-	0	0	0	0.0%	25.9%
Overhead Sign Structures Rehabilitation	Each	2,228	1,719	483	26	0	0	-	0	70	-	0	70	-	1,481	537	210	9.4%	11.4%
Pavement Class I	Lane Miles	2,741	557	2,138	46	576	16	-	626	171	-	1,202	187	-	1,553	1,161	27	1.0%	1.0%
Pavement Class II	Lane Miles	1,041	242	767	32	82	5	-	133	247	-	215	252	-	493	527	21	2.0%	2.0%
Pavement Class III	Lane Miles	375	154	213	8	0	0	-	18	35	-	18	35	-	75	292	8	2.1%	2.0%
Relinquishments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roadway Protective Betterments	Locations	0	-	-	0	-	0	-	-	0	-	-	0	-	0	-	0	0.0%	71.4%
Safety Roadside Rest Area (SRRA) Rehabilitation	Locations	6	4	2	0	0	0	0	0	0	0	0	0	0	1	3	2	33.3%	51.2%
Transportation Related Facilities	SF	216,712	0	159,669	57,043	0	0	0	0	7,255	-	0	7,255	0	7,255	79,834	129,623	59.8%	65.1%
Water and Wastewater Treatment at SRRAs	Locations	1	1	0	0	0	0	-	0	0	-	0	0	-	0	1	0	0.0%	11.1%
Sustainability																			
ADA Pedestrian Infrastructure	Locations	12,567	-	-	12,567	-	463	-	-	257	-	-	720	-	720	-	11,847	94.3%	92.7%
Advance Mitigation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bridge Scour Mitigation	SF	1,798	-	-	1,798	-	1,798	-	-	0	-	-	1,798	-	1,798	-	18,883	91.3%	51.1%
Bridge Seismic Restoration	SF	319,268	-	-	319,268	-	96,391	-	-	18,828	-	-	115,219	-	115,219	-	365,692	76.0%	73.1%
Hazardous Waste Mitigation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roadside Rehabilitation	Acre	4,407	881	1,322	2,204	0	0	-	0	106	-	0	106	-	632	879	2,985	66.4%	59.4%
Storm Water Mitigation	Acre	1,760	-	-	1,760	-	111	-	-	336	-	-	447	-	447	-	1,313	74.6%	71.0%
Zero Emission Vehicle Infrastructure	Locations	2	-	-	2	-	0	-	-	2	-	-	2	-	2	-	0	0.0%	0.0%
Performance																			
Commercial Vehicle Enforcement Facilities	Stations	7	0	7	0	0	0	-	0	1	-	0	1	-	1	3	3	42.9%	31.5%
Operational Improvements	DVHD	90,000	-	-	90,000	-	612	-	-	1,258	-	-	1,870	-	1,870	-	88,130	97.9%	97.6%
Sign Panel Replacement	Each	6,878	0	0	6,878	0	1,963	-	0	885	-	0	2,848	-	2,848	0	4,030	58.6%	74.6%
Transportation Management Systems	Each	1,578	946	0	632	0	80	20	0	836	30	0	916	50	1,465	0	163	10.0%	10.0%
Bridge Goods Movement Upgrades	SF	25,492,126	22,438,945	1,365,864	1,687,317	0	0	-	0	0	-	0	0	-	22,438,945	1,365,864	1,687,317	6.6%	12.2%
Weigh-In-Motion Scales	Stations	21	0	21	0	1	0	0	0	4	0	1	4	0	5	9	7	33.3%	31.8%
						Investment Plan Target*			$2,054,125,745										

(*) The Investment Plan Target includes the estimated SHOPP cost of the Remaining Performance AND additional funding for project-level cost anomalies, Complete Streets elements, etc.

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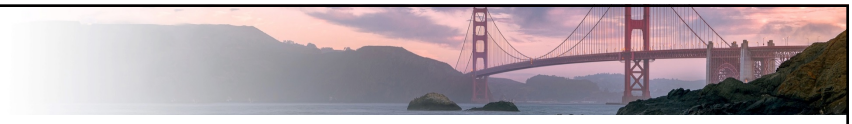
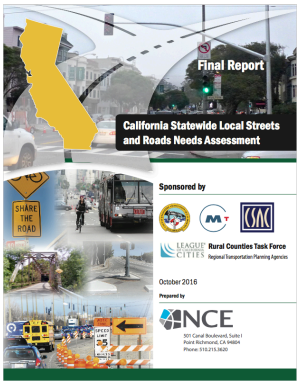


Estimating Local Pavement and Bridge Spending (pre-SB 1)

- FHWA Highway Statistics
  - $10.0 billion in 2014
  - $6.5 billion for capital and maintenance and operations
- California Statewide Local Streets and Road Needs
  - Projects annual spending over next 10 years for pavement, bridges and other essential items
  - $1.98 billion annually for pavement
  - $0.29 billion annually for bridges
  - $1.11 billion annually for essential items



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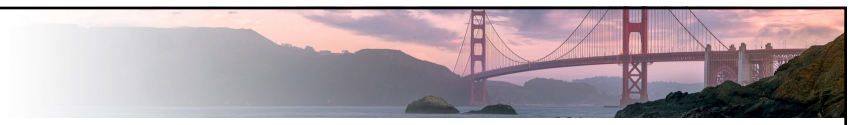

Estimating Local NHS Spending (pre-SB 1)

- Estimated local spending based on portion of the local system on the NHS
- Key figures
  - 5% of local system lane miles are on the NHS
  - 32% of local system bridge area is on the NHS
- Applying these percentages to estimated annual local agency spending on the NHS is approximately
  - $99 million for pavement
  - $93 million for bridges

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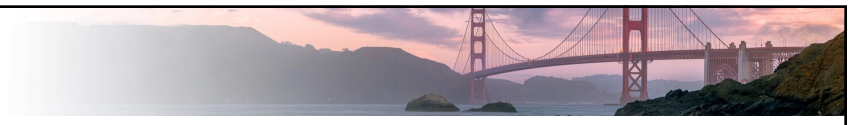

Estimating Local NHS Spending with SB 1

- SB 1 projected to add ~$1.22 billion per year for local roads and bridges
- Applying same percentages as the previous slide estimated annual local agency spending on the NHS is approximately
  - $134 million for pavement (increase of $35 million)
  - $127 million for bridges (increase of $34 million)

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MPO Asset Management Perspective

California TAMP
Financial Plan &
Investment Strategies
Workshop

Preserving & Enhancing Road Assets

ASSET MANAGEMENT FROM AN MPO PERSPECTIVE

Sui Tan, Metropolitan Transportation Commission

Overview

- MTC as a regional government
- Maintenance Needs Assessment
- Key Performance Indicators
- PMS Applications

San Francisco Metropolitan Region
Population = 7.4 million
9 counties
100 cities
43,000 lane-miles of local streets & roads
6,850 lane-miles of state highway (Caltrans)
23 transit agencies
7 toll bridges

One MPO -

Metropolitan Transportation Commission

Pavement Management Software

StreetSaver®:

- Network Level System
- Commercially available since 1986
- Designed for Local Agencies
- Cost Effective vs. "Worst First"
- Used by all Bay Area Jurisdiction; 420 nationwide

Local Streets & Roads Needs Assessment:

- Answer how much we need to invest as a region for
  - ✓ Pavement
  - ✓ Non-Pavement
  - ✓ Local Bridges
- Facilitate Regional Transportation Plan (RTP) discussion and funding policies
- Are easy due to exclusive use of a common PMS by Bay Area jurisdictions

28-Year Needs Assessment

($ in millions)

County	Avail. Revenues	Pavement Needs	Non-Pavement Needs	Total Capital Needs	Total Remaining Capital Needs
Alameda	$ 2,148	$ 3,715	$ 4,082	$ 7,798	$ 5,650
Contra Costa	$ 2,915	$ 3,111	$ 2,674	$ 5,786	$ 2,871
Marin	$ 655	$ 865	$ 641	$ 1,506	$ 852
Napa	$ 219	$ 1,087	$ 429	$ 1,516	$ 1,297
San Francisco	$ 2,299	$ 2,416	$ 2,363	$ 4,778	$ 2,480
San Mateo	$ 1,440	$ 1,929	$ 1,984	$ 3,913	$ 2,473
Santa Clara	$ 3,374	$ 5,776	$ 5,118	$ 10,894	$ 7,520
Solano	$ 488	$ 1,906	$ 1,289	$ 3,195	$ 2,707
Sonoma	$ 994	$ 3,699	$ 1,319	$ 5,018	$ 4,023
REGION	$14,500	$24,500	$20,000	$44,500	$30,000

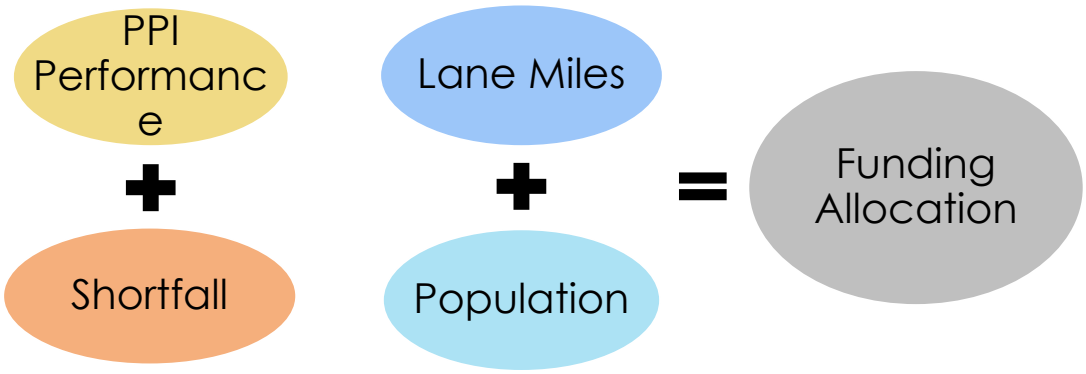
Outcome-Driven Performance Measure

Funding Allocation Formula:

- No advantage or disadvantage
- Data from StreetSaver PMS
- Promotes pavement preservation principles
- Replaces "Maintenance of Effort"

Behavior Change: Shifts practice from "worst first" to preventive maintenance

Success Story - MTC



KPI: Pavement Preservation index

What is the effort toward pavement preservation?

County	Jurisdiction	Network PCI	$PM/% Actual Lane Mile	PM	% PM Needs	Pavement Preservation Index
	Regional Benchmarks	**66**	**$ 1,336**	**17%**	**16%**	**1.06**
Alameda	ALAMEDA	66	$ 1,271	13%	15%	0.88
	ALAMEDA CO.	71	$ 671	18%	28%	0.67
	ALBANY	58	$ 1,247	10%	13%	0.78
	BERKELEY	58	$ 263	2%	11%	0.20
	DUBLIN	87	$ 3,124	50%	79%	0.62
	EMERYVILLE	75	$ 48	100%	35%	2.87
	FREMONT	63	$ 5,140	43%	16%	2.76

KPI: Asset Sustainability Index

$$= \frac{\text{Actual M\&R}}{\text{Annualized 10-Year Needs}}$$

County	Jurisdiction	Network PCI	Actual M&R /Lane Mile	Needs/ Lane Mile	Asset Sustainability Index
	Regional Benchmarks	**66**	**$10,400**	**$27,000**	**39%**
Alameda	ALAMEDA	66	$9,800	$26,900	36%
	ALAMEDA CO.	71	$3,600	$16,200	22%
	ALBANY	58	$12,700	$29,800	43%
	BERKELEY	58	$11,600	$32,400	36%
	DUBLIN	87	$6,300	$5,600	113%
	EMERYVILLE	75	$0	$16,100	0%
	FREMONT	63	$11,900	$29,100	41%
	HAYWARD	69	$14,000	$22,600	62%

Measure T—Fix Our Local Roads

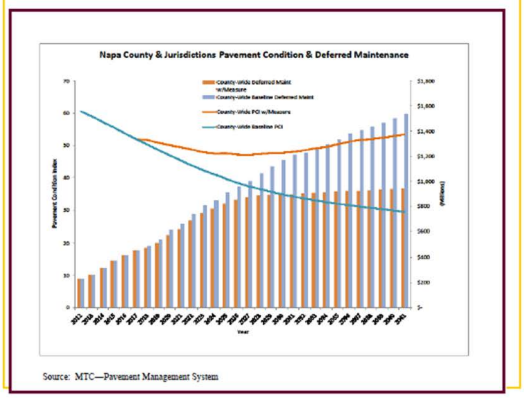
How did we get here?

Federal and State revenues over the last 10 years have been declining in both real and nominal terms. The 18.4 ¢ per gallon tax deposited in the National Highway Trust Fund for surface transportation projects has not been increased since 1993. Reductions in federal funds has been compounded by the diversion of millions in State Highway and local streets and roads funds for highway needs or to backfill shortfalls in the State's general fund.

What's the Problem?

The Cities, Town, and County of Napa have almost $300 million in deferred road maintenance. Without a near term infusion of new revenues, this figure is projected to grow to almost $2 billion over the next 25 years. Measure T will not solve all of the county's problems but will help get a handle on exponential growth of Streets & Roads Deferred Maintenance needs.

NAPA'S ROADS ARE THE WORST IN THE REGION - ON A SCORE FROM 25 (LOW) TO 89 (HIGH) - 90% OF NAPA'S ROADS ARE CONSIDERED VERY POOR OR AT RISK ON THE REGION'S PAVEMENT CONDITION INDEX (PCI).



Source: MTC—Pavement Management System

Napa Countywide Road Maintenance Act

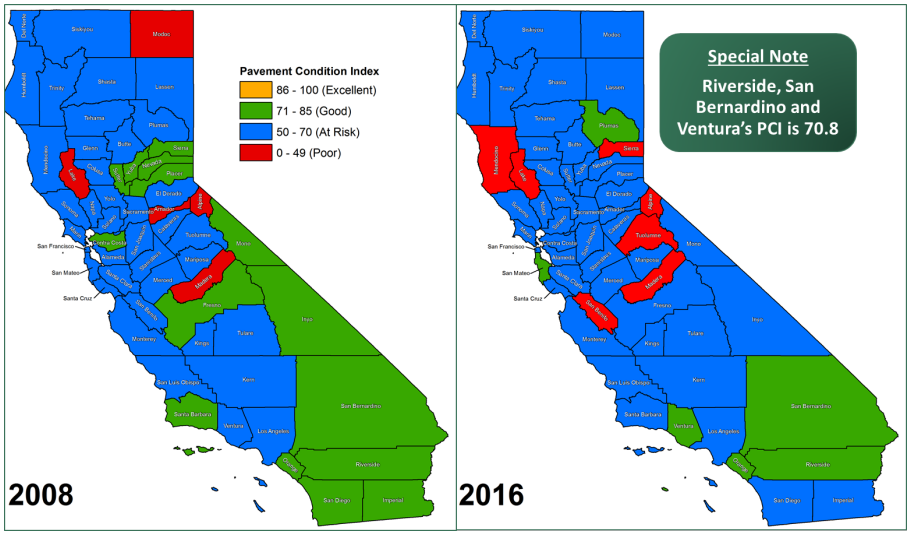
~$300 million over 25 years

- Dedicated funding:
  - 99% Local Streets Maintenance
  - 1% Administration
- 75% YES votes

YES ON T

FIX OUR LOCAL ROADS

California Statewide Local Streets & Roads Needs Assessment



What Are Funding Shortfalls?

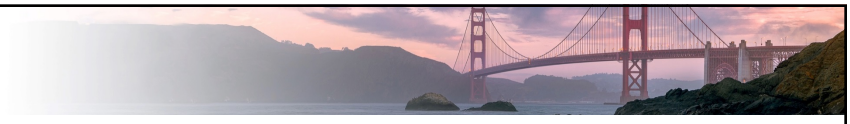
Transportation Asset	2016		
	Needs	Funding	Shortfall
Pavement	$ 70.0	$ 19.8	$ (50.2)
Essential Components	$ 32.1	$ 11.0	$ (21.1)
Bridges	$ 4.6	$ 2.9	$ (1.7)
Totals	$ 106.7	$ 33.7	$ (73.0)

Senate Bill 1 passed in April
Increase Gas Tax by 12 cents

A gas tax increase of 49 cents/gallon will erase this shortfall

Asset Condition Targets and Projections

California TAMP Financial Plan & Investment Strategies Workshop



Asset Condition Targets

- PM2 (23 CFR 490) Targets
  - Required by FHWA
  - 2 and 4-year horizons
  - Good and poor condition for Interstate and NHS pavement
  - Good and poor condition for NHS bridges
  - Budget-constrained
  - Caltrans sets statewide targets; MPO can adopt these are establish their own
- TAMP Targets
  - The TAMP must include the 2 and 4-year targets set through 23 CFR 490
  - We recommend establishing additional 10-year targets that reflect conditions consistent with achieving agency goals and objectives

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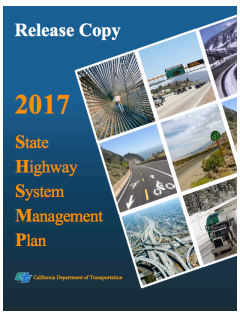
Asset Condition Targets (cont.)

- 2 and 4-year targets
  - Where will we be in 2 and 4 years given available funding?
  - Key issue is what work is currently underway or in the pipeline
- 10 year targets
  - Where will we be in 10 years given our goals and objectives?
  - Need to set considering asset life-cycle plans and other factors
  - Caltrans targets are set by CTC and specified in the State Highway System Management Plan (SHSMP)



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Potential 10-Year Targets

Owner	Network	% Good	% Fair	% Poor
Pavement				
Caltrans	Class I	60.00	39.00	1.00
	Class II & III	55.00	43.00	2.00
	NHS	58.38	40.29	1.66
Local/Other	NHS	55.00	43.00	2.00
All	NHS	57.26	41.19	1.77
Bridge				
Caltrans	All	83.50	15.00	1.50
Local/Other	NHS	83.50	15.00	1.50
All	NHS	83.50	15.00	1.50

Note: these figures assume CTC targets set for Caltrans assets are applied statewide

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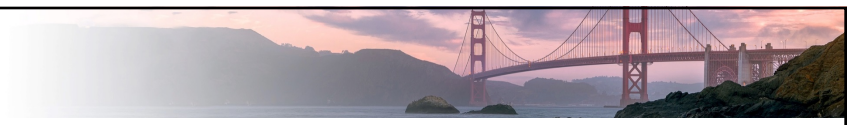
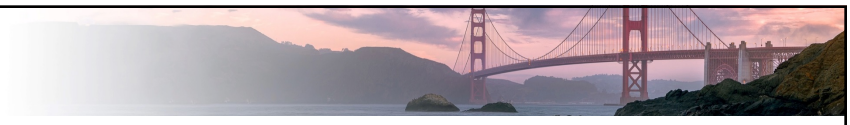


Predicting Asset Conditions

- Adapted the approach from the 2017 SHSMP
- High-level statistical model for each asset class
- For pavement and bridges: deterioration rates, costs based on more detailed models (e.g., PMS runs)
- Inputs
  - Existing conditions
  - Planned spending over next 5 years
  - Condition targets
- Outputs
  - Predicted condition given planned spending
  - Additional spending required to achieve targets



SHSMP Example

Bridge Health

Current Inventory	
245,756,328	SF

Projected Inventory (in 2027)	
245,756,328	SF

Effective Annual Deterioration Rate		
Into Fair	0.45	% per Year
Into Poor	0.75	% per Year

Current Condition		
Good	184,096,588	74.91%
Fair	53,560,236	21.79%
Poor	8,099,504	3.30%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	175,812,240	71.54%
Fair	57,827,565	23.53%
Poor	12,116,523	4.93%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	17,563,465	7.15%
Fix Poor to Good	4,901,702	1.99%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	205,206,534	83.50%
Fair	36,863,449	15.00%
Poor	3,686,345	1.50%

Performance Gap for the Last 5 Years		
Fix Fair to Good	5,829,933	2.37%
Fix Poor to Good	3,590,027	1.46%
Add New	0	0.00%

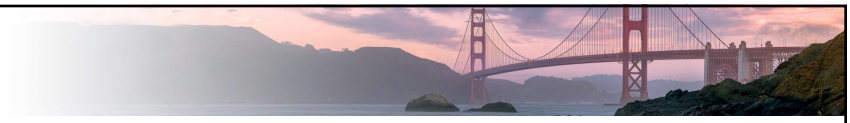
Average Unit Cost*		Support Ratio**
Fix Fair to Good	$260	32.31%
Fix Poor to Good	$380	27.11%
Add New	$500	27.00%

Estimated Costs				
Unfunded Pipelined Maintenance Work	$102,279,000	Maintenance Performance Gap	$559,673,568	**Total**
Unfunded Pipelined SHOPP Projects	$2,302,570,000	SHOPP Performance Gap	$3,182,138,398	**$6,146,660,966**

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	5,472,154	$635	$3,474,817,790	0	$635	-210,677	$344	-3,086	$483	$0
D2	5,657,505	$635	$3,592,515,675	0	$635	200,791	$344	116,294	$483	$125,242,106
D3	23,052,228	$635	$14,638,164,780	0	$635	141,017	$344	177,547	$483	$134,265,049
D4	53,117,342	$635	$33,729,512,170	0	$635	4,329,213	$344	967,548	$483	$1,956,574,956
D5	7,567,834	$635	$4,805,574,590	0	$635	-30,521	$344	30,807	$483	$14,879,781
D6	10,932,062	$635	$6,941,859,370	0	$635	-5,025	$344	203,038	$483	$98,067,354
D7	63,052,408	$635	$40,038,279,080	0	$635	-683,632	$344	458,977	$483	$221,685,891
D8	21,442,324	$635	$13,615,875,740	0	$635	-247,015	$344	-54,466	$483	$0
D9	984,611	$635	$625,227,985	0	$635	-52,865	$344	-3,999	$483	$0
D10	9,398,629	$635	$5,968,129,415	0	$635	355,640	$344	926,457	$483	$569,818,891
D11	25,492,125	$635	$16,187,499,375	0	$635	803,272	$344	312,820	$483	$427,417,628
D12	19,587,106	$635	$12,437,812,310	0	$635	-1,199,547	$344	396,539	$483	$191,528,337
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	245,756,328	N/A	$156,055,268,280	0	N/A	5,829,933	N/A	3,590,027	N/A	$3,739,479,993

(*) The unit costs represent a multi-year programmatic average of a number of activities included within this objective. These costs should not be used for project level estimates.
(**) The support ratios represent a multi-year cost-weighted average of a number of activities included within this objective. These ratios should not be used for project level estimates.



Key Assumptions - Pavement

- Deterioration rate (% per year)
  - Good to Fair: 8.78%
  - Fair to Poor: 3.37%
- Treatment costs for locals taken from the local needs report
  - $21.10/sq. yd. for thin overlays
  - $31.50/sq. yd. for thick overlays
  - $70.60/sq. yd. for reconstruction
- Fair pavements typically receive a thin overlay, poor pavements typically receive a thick overlay
- Over the 10-year period a pavement section will remain in good condition once fixed

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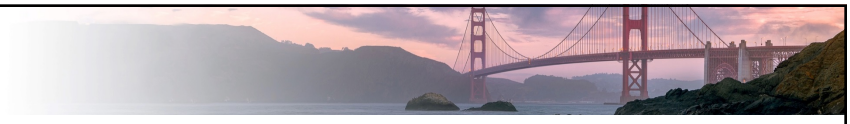

Key Assumptions - Bridges

- Deterioration rate (% per year)
  - Good to Fair: 0.45%
  - Fair to Poor: 0.75%
- Treatment costs taken from the local needs report
  - $344/sq. ft. to fix fair bridges
  - $380/sq. ft. to fix poor bridges
  - $400/sq. ft. for new bridges
- Deterioration rates reflect effects of routine maintenance work to address issues identified through bridge inspections
- Over the 10-year period a bridge will remain in good condition once fixed

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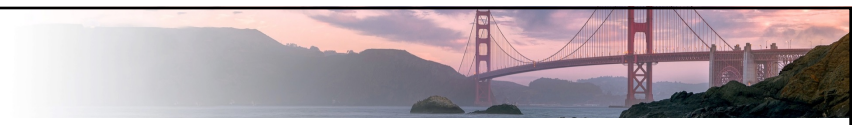

Caltrans SHOPP Funding – Expected and Required to Meet Targets (Annual $M)

Asset Class	Expected – with SB 1	Required to Meet Target	Gap
Pavement Class I	$1,260	$1,260	$0
Pavement Class II	$506	$506	$0
Pavement Class III	$126	$126	$0
Pavement Total	$1,892	$1,892	$0
Bridge Health	$615	$615	$0
Drainage	$502	$502	$0
Traffic Management Systems	$181	$181	$0

Source: 2016 NBI

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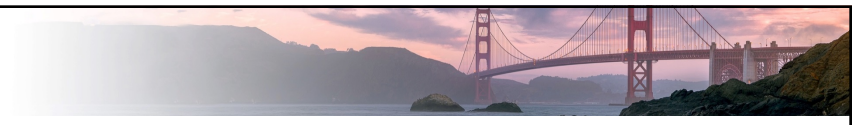

NHS Funding – Expected and Required to Meet Targets (Annual $M)

Asset Class	Owner	Expected – with SB 1	Required to Meet Target	Gap
Pavement	Caltrans	1,635	1,635	0
	Local/Other	134	157	23
	Total	1,769	1,792	23
Bridge	Caltrans	512	512	0
	Local/Other	127	412	285
	Total	639	924	285

Note: these figures assume CTC targets set for Caltrans assets are applied statewide

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Notes on the Calculations

- Caltrans costs are estimated costs for the SHOPP
  - Additional spending included in HM program
- Funding required to achieve targets depends upon the target values
  - See following slides for cost to achieve various targets for local/other pavement and bridges
  - These show average annual cost to achieve targets over a 10-year period
- CTC targets for Caltrans have been applied to entire NHS to established preliminary numbers

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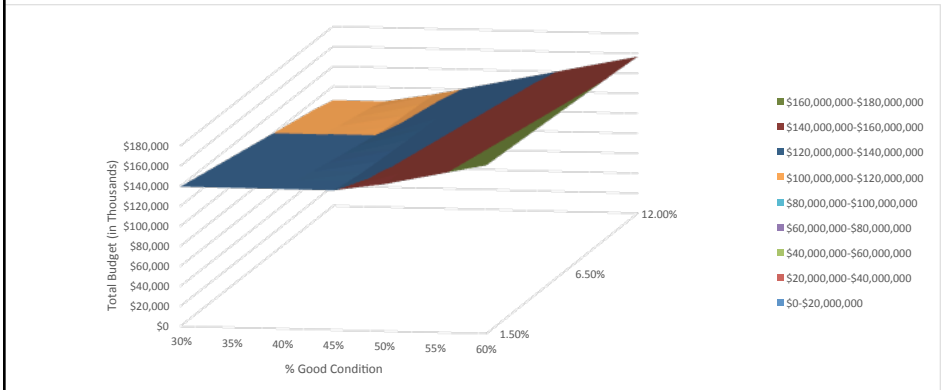
Required Local Spending vs. Pavement Targets (Annual $)



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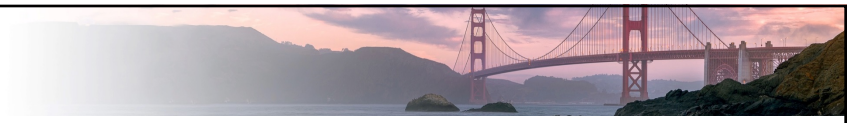

Required Local Spending vs. Pavement Targets (Annual $M)

	Good Target						
Poor Target	30%	35%	40%	45%	50%	55%	60%
1.50%	$139	$139	$139	$139	$147	$157	$168
2.50%	$136	$136	$136	$136	$146	$156	$167
3.50%	$133	$133	$133	$134	$145	$155	$166
4.50%	$130	$130	$130	$133	$144	$154	$165
5.50%	$127	$127	$127	$132	$143	$153	$164
6.50%	$123	$123	$123	$131	$142	$152	$163
7.50%	$120	$120	$120	$130	$140	$151	$162
8.50%	$117	$117	$118	$129	$139	$150	$161
9.50%	$114	$114	$117	$128	$138	$149	$160
10.50%	$111	$111	$116	$127	$137	$148	$159
12.00%	$106	$106	$114	$125	$136	$146	$157

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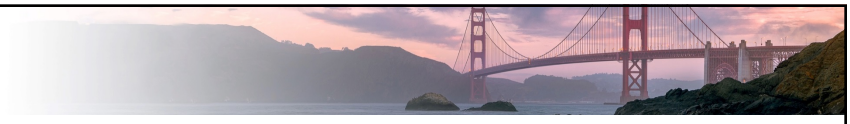
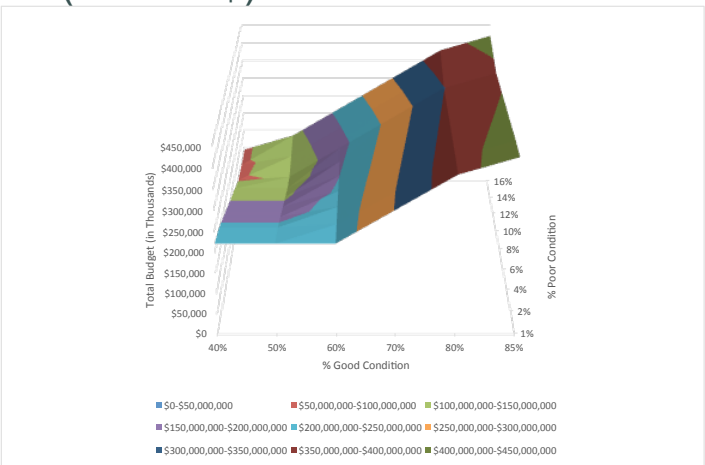


Required Local Spending vs. Bridge Targets (Annual $)



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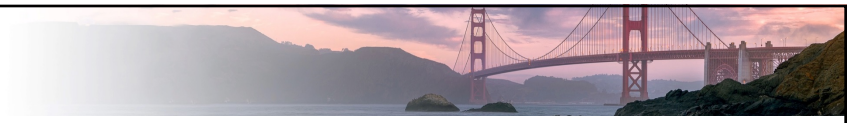

Required Local Spending vs. Bridge Targets (Annual $M)

	Good Target					
Poor Target	**40%**	**50%**	**60%**	**70%**	**80%**	**85%**
1%	$ 222	$ 222	$ 222	$ 303	$ 385	$ 426
2%	$ 210	$ 210	$ 219	$ 300	$ 382	$ 422
4%	$ 187	$ 187	$ 213	$ 294	$ 375	$ 416
6%	$ 164	$ 164	$ 205	$ 287	$ 369	$ 409
8%	$ 142	$ 142	$ 199	$ 280	$ 362	$ 403
10%	$ 119	$ 119	$ 192	$ 274	$ 355	$ 396
12%	$ 96	$ 104	$ 186	$ 267	$ 349	$ 390
14%	$ 93	$ 118	$ 199	$ 281	$ 362	$ 403
16%	$ 93	$ 134	$ 216	$ 297	$ 379	$ 419

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Group Exercise

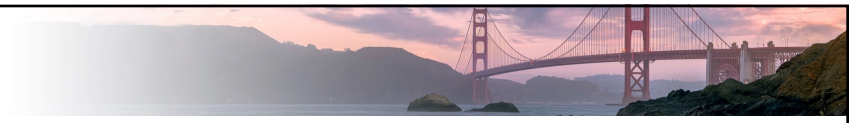
California TAMP Financial Plan & Investment Strategies Workshop

Group Exercise Reports

California TAMP
Financial Plan &
Investment Strategies
Workshop

Conclusion

California TAMP
Financial Plan &
Investment Strategies
Workshop



Results Discussion

- Key Issues
- Open Questions
- Next Steps

Appendix C. Workshop Handouts

In Exercise 1, each group received an exercise handout that had five questions related to investment prioritization.

Participants were also given a handout which listed inventory and condition of NHS pavement and bridges.

California TAMP – Financial Management Workshop – Small Group Exercise

Investment Prioritization

Assign a scribe for your group. Make sure there is an MPO/local representative in your group.

Use the workshop handouts and answer the following questions. Please use one form that you will hand in at the end of the exercise.

1. Do you agree with the approach that has been presented? If not, what concerns do you have?

2. What should be done in the future to improve the ability to make better investment decisions for the locally owned NHS pavement and bridge assets? Possible ideas include:

   - Better tracking of spending on the NHS
   - Better prediction of future asset conditions
   - Better sharing of information (local to local, Caltrans to local, local to Caltrans, etc.)

3. What are the current performance projections telling us?

4. Are there tradeoffs across assets that would make the overall network better?
   - If yes, what tradeoffs?

5. Is the development of the TAMP financial plan and investment strategies going to be used for awareness building or will it be linked to your planning and programming process to guide specific investments?
   - What additional information is needed?

2015 California Local, Federal, and Tribal NHS Pavement Inventory and Conditions by MPO/RTPA

MPO/RTPA	County	Road Miles	Lane Miles				Percentage		
			Total	Good	Fair	Poor	Good	Fair	Poor
Butte CAG		29	69	6	57	6	8.51%	82.73%	8.76%
Fresno (COFCG)		124	462	51	378	33	11.13%	81.81%	7.05%
Glen CTC		3	6	0	5	0	3.56%	92.87%	3.56%
Humboldt CAG		16	35	0	32	3	1.13%	89.96%	8.90%
Kern COG		179	551	73	458	20	13.27%	83.06%	3.67%
Kings CAG		11	32	3	29	1	8.71%	89.44%	1.85%
Lassen CTC		4	8	0	0	0	0.00%	0.00%	0.00%
Madera CTC		2	4	0	3	0	0.00%	90.71%	9.29%
Merced CAG		23	85	1	66	18	0.95%	78.25%	20.80%
Monterey (AMBAG)		80	220	17	193	10	7.83%	87.70%	4.47%
	Monterey County	52	143	13	122	8	9.16%	85.23%	5.61%
	San Benito County	6	17	2	15	0	11.00%	87.78%	1.22%
	Santa Cruz County	22	60	2	56	2	3.77%	93.60%	2.63%
MTC		945	2,986	65	2,714	207	2.16%	90.90%	6.94%
	Alameda County	193	579	5	526	48	0.89%	90.90%	8.21%
	Contra Costa County	198	613	15	574	24	2.49%	93.60%	3.91%
	Marin County	26	72	1	67	4	1.70%	92.84%	5.46%
	Napa County	10	29	0	25	4	0.00%	86.21%	13.79%
	San Francisco County	95	320	0	279	40	0.15%	87.31%	12.55%
	San Mateo County	19	51	0	48	3	0.87%	93.83%	5.31%
	Santa Clara County	290	974	34	881	59	3.44%	90.45%	6.11%
	Solano County	91	287	6	259	22	2.06%	90.35%	7.59%
	Sonoma County	24	61	3	55	4	4.17%	89.68%	6.15%
Sacramento ACOG		365	1,131	40	1,009	82	3.55%	89.18%	7.26%
	El Dorado County	1	3	0	3	0	0.00%	100.00%	0.00%
	Placer County	37	103	14	88	1	13.66%	85.54%	0.81%
	Sacramento County	297	939	21	841	77	2.25%	89.59%	8.17%
	Sutter County	0	0	0	0	0			
	Yolo County	30	86	5	76	5	5.85%	88.72%	5.43%
	Yuba County	0	0	0	0	0			
San Joaquin COG		155	544	51	477	17	9.29%	87.67%	3.03%

2015 California Local, Federal, and Tribal NHS Pavement Inventory and Conditions by MPO/RTPA

MPO/RTPA	County	Road Miles	Lane Miles				Percentage		
			Total	Good	Fair	Poor	Good	Fair	Poor
San Luis Obispo COG		16	47	3	39	5	6.17%	83.25%	10.58%
SANDAG		275	998	3	862	133	0.25%	86.39%	13.35%
Santa Barbara CAG		46	122	3	112	7	2.65%	91.42%	5.93%
SCAG		3,058	11,500	206	9,536	1,758	1.79%	82.92%	15.29%
	Imperial County	126	284	11	185	88	4.02%	64.96%	31.02%
	Los Angeles County	1,684	6293	90	4,964	1,238	1.43%	78.89%	19.68%
	Orange County	603	2706	21	2,487	197	0.79%	91.91%	7.30%
	Riverside County	181	675	8	590	77	1.13%	87.43%	11.45%
	San Bernardino County	319	1038	34	887	116	3.31%	85.47%	11.21%
	Ventura County	145	504	41	423	40	8.06%	83.91%	8.02%
Shasta (SCRTPA)		2	10	1	9	0	13.29%	85.39%	1.33%
Stanislaus COG		59	204	24	157	23	11.92%	77.00%	11.08%
Tahoe MPO		2	4	0	1	3	0.00%	31.08%	68.92%
Tulare CAG		36	96	12	79	5	12.22%	82.76%	5.03%

Source: 2015 Highway Performance Monitoring System.
Note missing data have been omitted in the percentage of good/fair/poor and these percentages have been applied to reported total lane miles to estimate lane miles good/fair/poor.
Only MPOs and RTPAs with NHS assets are listed.

2016 California Local, Federal, and Tribal NHS Bridge Inventory and Conditions by MPO/RTPA

MPO/RTPA	County	Count	Deck Area				Percentage		
			Total	Good	Fair	Poor	Good	Fair	Poor
Butte CAG		7	41,779	25,692	16,087	0	61.50%	38.50%	0.00%
Fresno (COFCG)		38	410,970	275,929	109,083	25,958	67.14%	26.54%	6.32%
Humboldt CAG		2	3,871	1,954	1,917	0	50.48%	49.52%	0.00%
Kern COG		69	836,655	589,606	247,049	0	70.47%	29.53%	0.00%
Mariposa LTC		3	24,726	24,726	0	0	100.00%	0.00%	0.00%
Merced CAG		11	66,541	29,385	23,938	13,218	44.16%	35.97%	19.86%
Monterey (AMBAG)		11	125,390	17,590	107,800	0	14.03%	85.97%	0.00%
	Monterey County	8	105,118	10,374	94,744	0	9.87%	90.13%	0.00%
	San Benito County	0	0	0	0	0			
	Santa Cruz County	3	20,272	7,216	13,056	0	35.60%	64.40%	0.00%
MTC		292	5,037,994	2,359,919	1,800,830	877,245	46.84%	35.74%	17.41%
	Alameda County	48	949,049	677,922	218,724	52,403	71.43%	23.05%	5.52%
	Contra Costa County	64	694,466	287,521	237,592	169,353	41.40%	34.21%	24.39%
	Marin County	2	561,702	0	561,702	0	0.00%	100.00%	0.00%
	Napa County	8	138,682	11,543	34,820	92,319	8.32%	25.11%	66.57%
	San Francisco County	15	288,015	104,812	171,193	12,010	36.39%	59.44%	4.17%
	San Mateo County	27	736,230	266,135	44,831	425,264	36.15%	6.09%	57.76%
	Santa Clara County	107	1,522,989	952,218	451,907	118,864	62.52%	29.67%	7.80%
	Solano County	13	90,219	36,598	46,589	7,032	40.57%	51.64%	7.79%
	Sonoma County	8	56,642	23,170	33,472	0	40.91%	59.09%	0.00%
Sacramento ACOG		96	1,236,122	819,888	416,234	0	66.33%	33.67%	0.00%
	El Dorado County	0	0	0	0	0			
	Placer County	15	210,596	146,266	64,330	0	69.45%	30.55%	0.00%
	Sacramento County	76	954,928	656,876	298,052	0	68.79%	31.21%	0.00%
	Sutter County	0	0	0	0	0			
	Yolo County	5	70,598	16,746	53,852	0	23.72%	76.28%	0.00%
	Yuba County	0	0	0	0	0			
San Joaquin COG		34	631,621	290,734	318,031	22,856	46.03%	50.35%	3.62%
San Luis Obispo COG		5	32,870	9,319	23,551	0	28.35%	71.65%	0.00%
SANDAG		66	1,285,497	458,599	535,236	291,662	35.67%	41.64%	22.69%

2016 California Local, Federal, and Tribal NHS Bridge Inventory and Conditions by MPO/RTPA

MPO/RTPA	County	Count	Deck Area				Percentage		
			Total	Good	Fair	Poor	Good	Fair	Poor
Santa Barbara CAG		26	157,794	78,910	36,536	42,348	50.01%	23.15%	26.84%
SCAG		946	13,232,992	5,255,094	4,928,664	3,049,234	39.71%	37.25%	23.04%
	Imperial County	1	3,915	3,915	0	0	100.00%	0.00%	0.00%
	Los Angeles County	574	8,213,046	2,661,132	3,158,883	2,393,031	32.40%	38.46%	29.14%
	Orange County	185	2,580,370	1,600,120	842,144	138,106	62.01%	32.64%	5.35%
	Riverside County	77	1,013,783	605,393	349,530	58,860	59.72%	34.48%	5.81%
	San Bernardino County	74	902,825	324,424	439,889	138,512	35.93%	48.72%	15.34%
	Ventura County	35	519,053	60,110	138,218	320,725	11.58%	26.63%	61.79%
Shasta (SCRTPA)		4	354,863	125,810	229,053	0	35.45%	64.55%	0.00%
Stanislaus COG		9	193,421	46,244	121,398	25,779	23.91%	62.76%	13.33%
Tulare CAG		3	32,740	4,628	28,112	0	14.14%	85.86%	0.00%

Source: 2016 National Bridge Inventory
Only MPOs and RTPAs with NHS assets are listed.